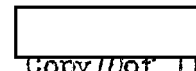


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NRO REVIEW COMPLETED

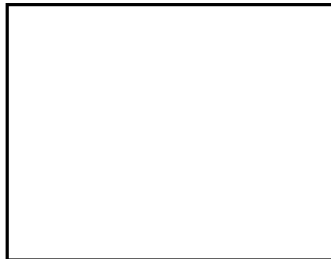
7 March 1962

MEMORANDUM FOR : Chief, Development Branch, DPD-DD/P

SUBJECT : Trip Report

1. PURPOSE: Visited Itek on 6 March to attend SETD design review meeting on the auxiliary frame instrument.

2. ATTENDANTS:



Hqs/CCB  
SETD  
SETD  
Itek  
Itek  
Itek  
Itek

There was one other man there who works for [redacted] whose last name is unknown. I think the man was [redacted]

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3. DISCUSSION:

a. Brief History of Instrument 74: This was the first flight article that went with the M1 system and had been plagued with failures and field fixes since it has been received by LMSC. The item itself is not considered reliable, but since it had been fused out of the system so it could not interfere with the primary mission, the decision was made to fly this instrument since it was definitely working at least through all loading operations [redacted] at the base. Indications are that it probably worked through part of the pad run. A decision was made prior to launch that mission 9031 would not be delayed for the auxiliary frame camera, therefore, it flew without telemetry points to the cassettes takeup and shutter monitoring in operating condition. Time to repair these items was not available. Because there were no monitoring points within the auxiliary frame camera during flight the only indication of operation was a telemetry pulse showing activation of

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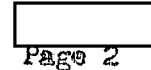
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the stepping switch to the frame camera about every seventh frame. This showed that command was being given to the frame camera to operate in the proper sequence.

b. Discussion On 74 Failure: This particular instrument was one of the first articles made and could be considered truly a prototype instrument. However, it was felt that this particular instrument may have been supersensitive to tension. While it is not felt that the second generation of production items will be as sensitive as 74, I recommended that in-house tests be run to determine the sensitivity of the auxiliary frame camera to tension. For example, it has been noted with 74 if the takeup motor was pulling to tightly against the instrument it would fail to operate. It is at least possible that during lift-off vibrations may have ratcheted the takeup cassette forward enough to place excess tension on the system thereby causing this failure. Based on these in-house studies, SETD will review and recommend whether we should consider proving a relaxation of the anti-backup mechanism during lift-off for the auxiliary frame camera much as we provide for the main instruments. In addition, I requested that the takeup motor, which was recovered with the bucket, be carefully tested and evaluated to see if it was still in operating condition or if there were any indications that this instrument had failed during flight. Unfortunately, part of the takeup motor was sent to [redacted] with the takeup spool. This part is being returned to SETD for study with the basic torquer motor unit.

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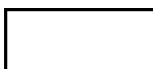
c. Resume of Qualification and Acceptance Test Problems: In general, the pressures of producing this item in a limited time period resulted in the usual compromises and "file to fit" techniques in putting together hardware for the first time from engineering drawings. A number of problems occurred within the shutter area (springs, pins, and gear train). Itek had been forced to use an off-the-shelf amateur shutter to meet schedules. The one chosen was a [redacted] type which still had the internal mechanisms for time delay pictures and time exposures associated with the normal amateur camera. [redacted] is now sending an improved shutter with these redundant features eliminated as an interim fix. The extra complication appears reasonably well eliminated and the timing problem much simplified. In addition, Itek has contacted [redacted] and they have agreed to furnish a shutter to meet the Itek specifications. This longer range improvement will be evaluated for possible phase-in down-

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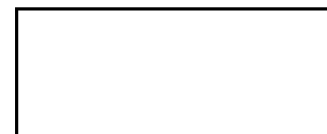
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stream. The [ ] shutter will greatly improve accessibility and external TM points. In addition, new improvements in lens barrels now permit the Réseau grid to become an integral part of the lens barrel so that the entire lens system may be removed from the camera as a unit without disturbing the calibration. With the new lens housing and a connection plug for the electrical interface, the film supply with the platen can be easily removed for loading, cleaning, etc. The general problems of supersensitive adjustments, clearance problems, quality control, test procedures and interchangeability of parts were discussed at great length and it is felt that while Itek has to tighten up on several of the items, they now have the general problem well in hand.

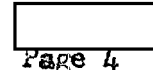
d. Spool Shafts: The original design of the shaft to hold the supply spool had failed originally and a quick fix was difficult to install in the unit. A new design has been made requiring a retrofit to existing units and the least re-qualification as a component. Itek will qualify as a component and unit #78 (with the new spool shaft installed) will be shipped to LMSC for mating with M4 for full test as a system. The problem of the inside diameter of the supply spool being too tight for the old shaft has disappeared with this fix.

e. Calibration: Weather has been a problem in obtaining stellar photography to calibrate the Réseau grid. Itek is working on a goniometer technique which is good to 1/10 of a second. This technique has been approved by ACIC. The current system for calibration requires that Boston send the Réseau grids to ACIC for basic calibration of the grid itself, then the grid is returned to Itek to make some stellar exposures. Then Itek returns this to ACIC for final calibration of the system. The techniques used by ACIC includes integrating this data into their "Frankenstein." I feel that the technique is required to get basic calibration data to all users. It appears that right now, ACIC has the calibration stored in such a manner that it may not readily be capable of dissemination. It is recommended that a representative of NPIC and AMS discuss this thoroughly with ACIC. Initial contact could be made at the 13 March meeting scheduled for Major Howard's office when all parties will be present.

f. Field Maintenance and Operational Handbook: During the loading operations on 9031, it was obvious that the lack of a handbook on procedures contributed greatly to the failure of

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the first auxiliary frame flight. During the loading operations a number of questions arose which could not be answered, but rather a technique was used to simply try and see if it would work. A preliminary handbook has been prepared by Itek and is now going into final review prior to publication. Itek field service reps will have an opportunity to add their inputs to the final document. This should be published within a week or ten days.

4. CONCLUSION: Units from #76 on included all of the modifications inhouse to date. SETD agreed that for all practical purposes, these newer units are almost a different instrument although they will remain over an extra day to go into detail of electrical interface. Units #70 and #72 are at Itek. #70 will be reworked and returned to LMSC for M3. #72 has a broken grid and has been vibrated twice. It was suggested that #72 be used as a backup unit and a test bed for requalifying modifications as required. #74 has been expended on mission 9031. #76 was the qualification unit but is in extremely good shape and can be shipped to fly with M2. #78 will be shipped as soon as possible to go through HATS and vibration with M4. #80 is in assembly and is programmed to be shipped to meet schedule with M5. Pending the results of tension tests to be conducted by Itek, no further action is considered necessary at this time.



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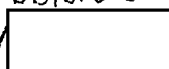
- 1-C/DB/DPD
- 2-C/SRS/DPD
- 3-C/SPB/DPD
- 4-SA/TA/DPD
- 5-USAF (Major. Howard)
- 6-[Redacted] (AFSSD)
- 7-Col. Murphy (LMSC)
- 8-NPIC [Redacted]
- 9-DB/DPD
- 10-RI/DPD
- 11-DB/DPD (Chrono)

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